# Lamp Factory Notebook, N-86-06-28

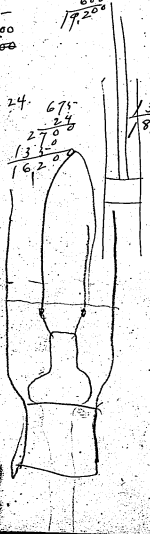
This notebook covers the period June-September 1886. All of the entries are by Edison. The name of John F. Ott appears frequently as a witness. The book contains notes, drawings, and calculations relating to lamp experiments. The lamps are numbered 1 through 18 and 159 through 222. Loose pages containing the results of lamp tests have been pasted onto many of the notebook pages. The spine is labeled "35." The pages are unnumbered, and the book has been used in both directions. Approximately 200 pages have been used. Some pages have been torn out of the book.

24—
600
14400

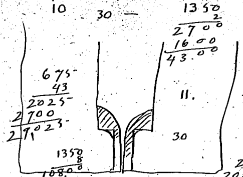
32
600
19,200

675
27
4725
1350
18,225

24.
675
24
2700
1350
16,200



151.



1350
2
2700
1600
43.00

675
43
2025
2700
29,025

1350
8
10,800

33
675
33
2025
2025
22275

11
11
11
11
121

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151
16
906
151
24,1

June 28 1886

Expmts on Lamps

60c No 1 Gasolene washed 480 m

2 Alcohal + KO – broken accid

3 " " 115 min

4 Nitric a then rinsed alcohol 90 m

5 – Hot Bi Chrom K + SO4 Rinsed $H_2O$ 5 m

6 HCl then alcohol

7 alcohol twice, hot,

8 Bisulphide Carbon only

9 Soaked 1/2 hr alcohol clean

clamps scarcely any air come off Lamp on pump

No 10 alcohol afterward Bisulphide

No 11 alcohol then bulb heated Continuously by Kerosene Lamp while on pump

Econ 152 at 16 cp. 398 at 80
June 28 — lasted 195 rather black
Cp 80 - 90 - 82 - 80 - 72 - 68 - 65 62 60 56 — Every 10 min

No. 12 = Lamp washed alcohol. then run off with Kerosene Lamp under it — gave spectrum H, Very strong Hg + faint CO or $CO_2$ -

177 on scale shews very strong violet line, this I thought was always a CO line . 125 being the strongest CO line but this 177 is 3 times as strong as 125 in this lamp hence it must be due to something else. The sparking has only plat points 2 lines at 130 + 131 —

Barker says 177 is H line

No 11 — at 16 cp — 155 cphp — 418 at 80 cp — drop in cp — 20 min 84
40 min 65 — 60 m 64 80 m 52 100 m — 51. 120 m 47
Quite black Lasted 135 min

No 10 – Bisulphide C & first Alcohol –
149 c per hp at 16. 398 at 80 –
Lasted 365 min Moderately black –

| | | 1st hour | 2 | 3rd | 4 | 5 |
|---|---|---|---|---|---|---|
| drop | 80 – | 72 | 64 | 55 – | 48. | 44 |

6th 40 c power –

---

No 13. no alcohol Heated by Kerosene Lamp – Fused KO in bulk –
Spectrum Strong mercury – Line 177
Sodium Line, faint Trace of Red H line
Line 106 $\frac{1}{2}$ – no signs of CO –
Arcd at 40 min – didnt vary in Cp – Economy 152 at 16 411 at 80

$133\frac{1}{2}$
160
101
115
96
$93\frac{3}{4}$
$91\frac{1}{4}$
$86\frac{1}{2}$
138 — $\frac{10}{8}$
136

91 93 96

No 12 Blackening on glass absorbed gases so couldnt get spark after heating Lamp. Vac Low — H brilliant, CO moderate Hg very strong. Sodium moderate,

---

14 — Phos anhy + K — Lamp nothing in
Lamp heated Kerosene Lamp —
K melted got air out finally
Kept low heat absorb CO,
Sealed Lamp off cold being cold
5 min previously hot both
Lamp & filament gave plenty
Hg = afterward cooling Lamp
& slightly heating K no Hg —
Couldnt get a spark through
Sealed off spark gauge
Set Lamp up for [illegible] — sealed
gauge — got no Hg — but very
strong H — also Amco $133\frac{1}{2}$ 160

101 115 96 93¾ 91¼ 86½

158 156 —

No 14 (Lasted) 80m — 151 c palp
406 at 80

80c 20min 40m 60 —80
88 — 74 65 62cp —

Rather black —

---

No 15 Exhausted with Kerosene Lamp not heated on Vac - sealed off and set up -

---

No 16 — $\frac{1}{500000}$ of atmosphere, lots Mercury - also CO, faint Hydrogen moderate + N. fooled with it incipient arcs due to spark being on when Lamp lighted — Vac got so perfect couldnt pass spark it first, heated & made magnet arcs this knocked vac down slightly saw H, Hg & CO — afterward by absorption of glass or clamps got so high couldn't get spark through Sent it to get curve main reports takes 126 volts to get 16 candle. .67 ampere, hasn't ~~volts nuff to set~~ at 80 —

---

17 another lamp not heated by Kero or. fil'y Current, absorbtion K & Charcoal in tube, heated filament after sealing — Knock vacuum down & charcoal after laying all night didn't appear to absorb — Hydrogen & Nitrogen strong pink on clamps — CO very faint, NO Hg — Set it up for curve —

18

Iodine in Lamp with Copper Hgd - to absorb it & prevent going in ~~bulb~~ pump - arced 75 min 161 cphp at 16 438 at 80. 80° $\overset{20\text{ min}}{82}$ $\overset{40\text{ min}}{68}$ $\overset{60\text{ min}}{60}$. whitish deposit globe at first.

---

17 Iodine in bulb -
Lasted 60 min - 168 cphp
at 16 - 462 at 80.
$80^{cp}$ $\overset{20\text{ min}}{78}$ $\overset{40\text{ min}}{70}$ - Whiteish
Iridescence Deposit near clamps.

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122 - intensity 12 - sharp

108.5 " 9 "

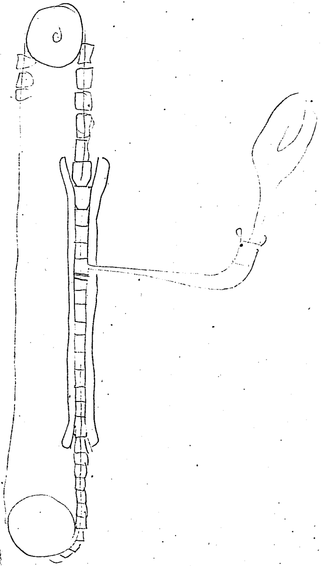
Hg - 114.5 " 8. slowly increasing

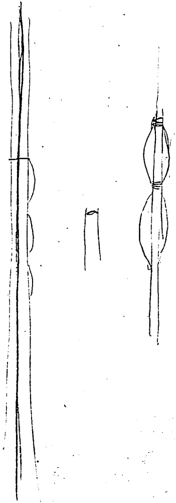
fluted spec nitrogen ✓

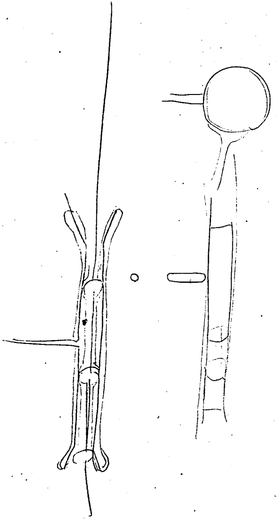
CO strong

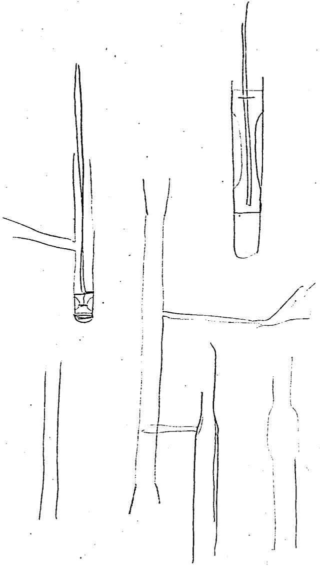
122 gradually disappear

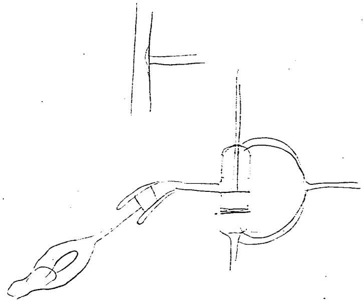
H line thin





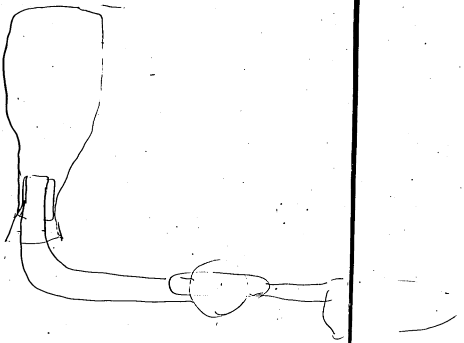




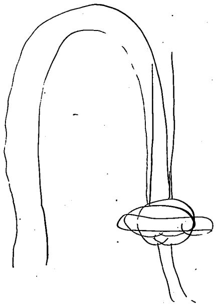


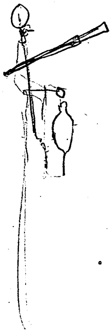
83½ - H.
142 8/10 H
179 5/10 H.
125 8/10 - Carbonic acid $CO_2$
109 7/10 – $CO_2$
95 - $CO_2$

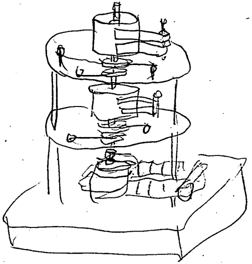
A spectrum of a tube taken off of a washed Hydrogen pump. No spark having passed through it. Another gauge on the same pump which had sparks pass through it several hours, showed no carbonic acid. This shows that carbonic acid or organic matter was either on the magnesium electrodes or on the glass. These readings were gotten by making the slit for each line very fine, reading from the left-hand edge and focusing both



the scale and telescope for Each line. The width of the line I have called 2/10 of a degree.







3c

180
20000
3600000

800 —

1.80.

1500, | 1.080
800
7000
640
600

15000 x 15000 x 5000

$$\frac{15000 \times 15000 \times 5000 \times 8}{1000000 \times 20 \times 45}$$

2000

120

$$3\,\overline{)\,90000}\;\;400$$

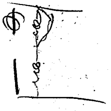
9/30,000

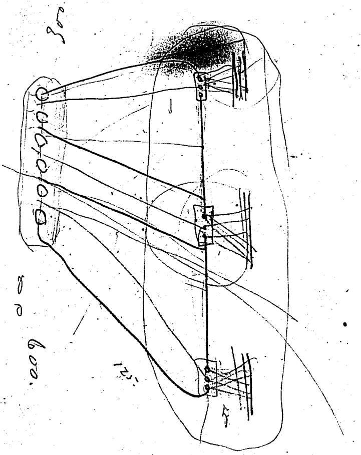
13333

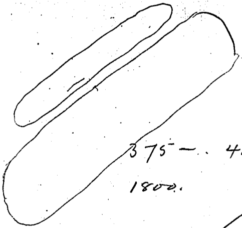
13333

5700,

$$\text{lb} = \frac{C.P. \times D^2}{1000000 \times V}$$ for 3 wire system



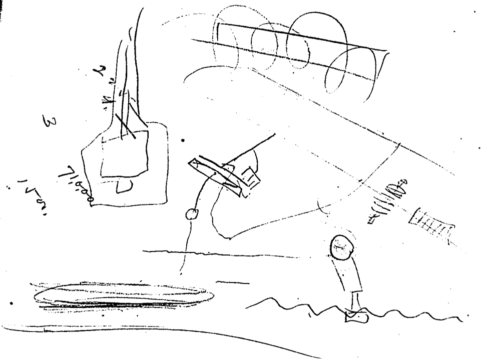


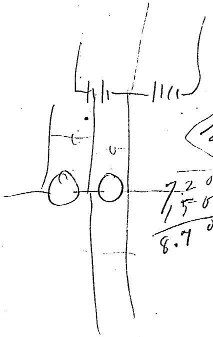


375 — . 400

1800.

1800.


2
4.
3
71,000
1,500.



0002

1.75

1.50
3000
4.50000.
~~4~~45000
6.5000.

100.

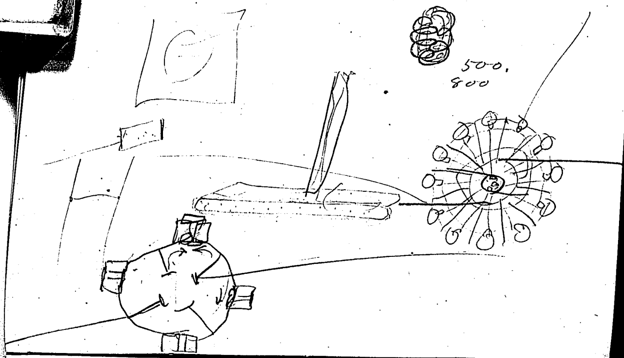
1800
4

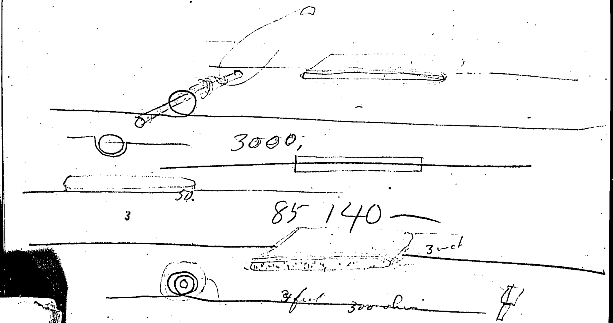
7200.
1500
8.700.

350.

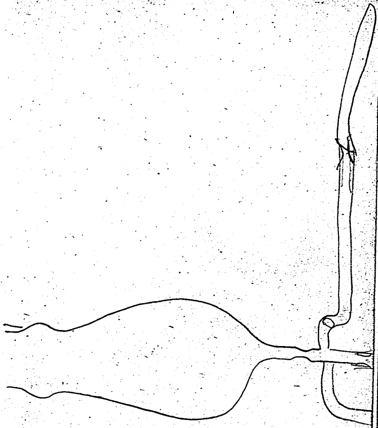
7
1500/12000

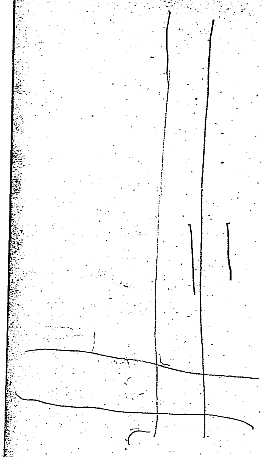
2


500.
800


3000;
50.
85 140
3 watt
3 feet 300 ohm

XE-172 N-86-06-28





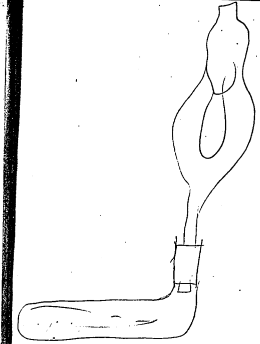
J. F. Ott

Oil - glycerine; - pump Hot - use paraffine;

Iodine; to attack Hg & Antimony or Bismuth to absorb -

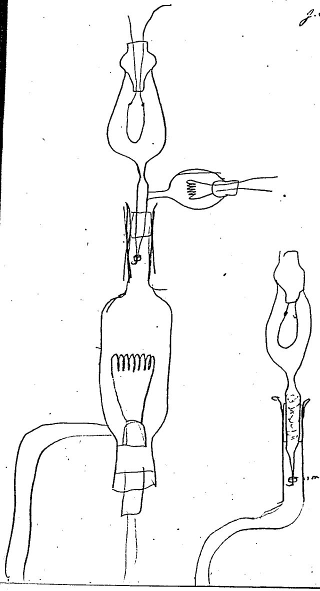
Iron Spiral metallic spiral iron prefd - Kept Hot by Current or combustion tube containing iron or metal or material when heated decomposes water & produces a solid Oxide -
Use Extra iron filament in Lamp which is to be heated by Current after vacuum obtained while Lamp hot by Kerosene Lamp afterward raising same to melting point & breaking it & drawing it down by magnet,

Straightening filaments,



J. F. Otto

J. F. Ott



Aug 10 1886 - J F Ott

Made 6 lamps with
Telephone lampblack which
is good conductor, an extra
platina wire passes in lamp
+ lays inside lamp down
where it is sealed - The Lampblack
lays in bulb the lamp being
inclined) it is heated by
Kerosene Lamp to drive off
gases + decompose Hydrocarbon
+ Eliminate water - after
Lamp sealed off the Lampblack
is shaken down to bottom of
globe where it comes in contact
with the Extra platina wire
Lamp is then set up at 80 cp
the extra platina wire is
connected to positive + some
Lamp are connected to

Aug 10 1886 TAE J. F. Ott

negative wire outside lamp tests show that when wire connected to positive life is longer. it may be that when connected to negative it has a bad Effect on filament & the reason why lamps last longer on p is there is no Effect, I have also made several lamps with carbonized anthracite Coal powder - This gives off scarcely any gas & doesnt dirty the lamp bulb - The p wire to Carbon powder gives best results, I notice that the blackening instead

Aug 10 1886 TAE    J. F. Ott

of Slopping Shaft at Clamps
Extends clear down below
Clamps to surface of the
anthracite, —

I am trying putting a
Coating of glacial phos.
acid on inside globe &
connecting it to the wire
that is near the seal so the
potential of the globe
will be the same as the
Clamp —

159 Aug 10 1886 J.F.Ott

Unwashed Undried
powdered anthracite in
side tube Extra wire
leading into inside part
Anthracite heated with
Kerosene lamp worked
regular way reversed
Current, worked anthracite
in bottom of globe after
sealing off lamp.
Then sealed side tube off -
fil showing clamp + globe
Clean -

160 Aug 10 1886

J. F. Ott

Same as 159

fil shung. globe + clamps clean

161. Aug 10 1886 TAE

J. F. Ott

Same as 159

Clean polishing globe + clamps

162. Aug 10 1886 -
J. F. Ott

Same as 159 except there is 3 times as much anthracite, so it will nearly touch wires as they come into vacuum -

fil shiny Clamps + globe clean -

163 Unwashed & undried)
J: F. Ott

Powdered glacial phosphoric acid put in globe little water put in — put on drier & dried hot, then allowed Cool — put on pump worked regular way —
clamps & globe clean polishing —

Aug 10 1886 TAE
164 — Unwashed J. F. Ott

powdered glacial phosphoric acid a little water in globe to make conducting surface

Extra wire into vacuum down at seal — put on drier & heated, cooled & then put on pump heated with Kerosene — Current reversed — fil shiny globe little whitish clamps clean —

to beam its extra wire connected opposite to 163 — peculiarity is that inside part little yellow also globe near clamps —

165 - Unwashed Undried - Aug 19 1886 7 AM

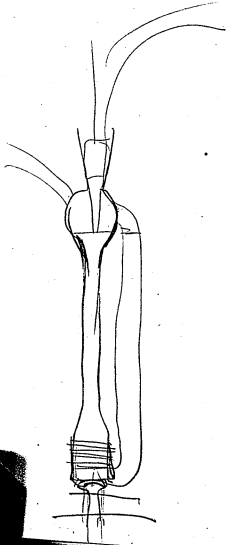
J. F. Ott

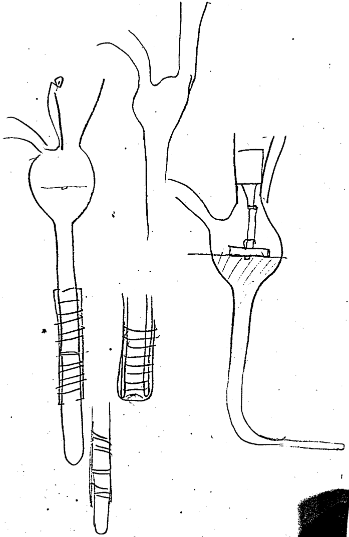
1 Milligramme Napthalin - Exhausted regular reversed Current - Clamps clean globe clean fil shiny run fil up higher than usual by running peg down quickly -

166 — Aug 10 1886. TAE

Same as 165 — J. F. Ott

appearances same —





Aug 10 1886 TAE

167 - J. F. Ott

Dried on drier -

2 milligrammes Napthalin in globe = Let it burn at about 16 @20 candles as it seems to deposit best at lower incandescence on bringing it up high the globe was very much whitened there seems to be a chemical reaction taking place - fil very shiny by deposit both clamps although I didnt reverse -

168 Aug 10 1886 TAE —

J. F. Ott

Dried on Drier —

2 milligrammes terchloride Carbon
got vac then gradually run to
about 16 cp then let it stay
deposit good at this cp +
lots gas comes off & still
let it burn notwithstanding
the great amount gas — dont
think it Chlorine as it
didnt dirty tube but very
little; globe kept perfectly
Clear of blue; a small
amount whitening took place
both sides near clamps perhaps
Chloride Copper — run it up high
didnt whiten any more but
when very high blue came in
removed clamps; clean globe
Clear & fil very shiny —

9/10/86 No 169

| V | amp | Res | Ft lb | Lamps H.P. | C.P. H.P. | @ C.P. |
|---|---|---|---|---|---|---|
| 106 | .75 | 141 | 3539 | 9.32 | 149 | 16 |
| 138 | 1.08 | 128 | 6592 | 5.01 | 401 | 80 |

set up - 40 min - 90 min - 353 min = 665 min = 930 min.
80 - 80 - 72 - 50 - 40 - 36

Minutes lasted 960

Not very black for life
Clamps clean fil dead black

Aug 11 1886 -

169 — Dried — J F Ott

1 milligram ter chloride Carbon — worked reg not reversed - blue in globe took it off pump rather quickly globe clean filament shiny but can't see that there is any deposit of any consequence Clamps Clean

Dried — J. F. Ott

Silicon 1/2 thimbleful heated by Kero — Extra wire in Vac to connect to it — one clamp moderately clean other dirty fil showing —

171 —

Dried — J. F. Ott

1 Milligrame anthracene —
didnt heat with Kerosene —
Clamps clean filament
very shiny pbly deposit slightly
globe yellow tint all over!
white volatilized anthracene
in neck.

9/10/86 No. 171 — Box 8

Lamp C.P.
V – amp – Res – Ftlbs – H.P. – H.P. @ C.P.
106 – .71 – 148 – 3318 – 9.94 – 109 = 16
138 – 1.06 – 130 – 6409 – 6.11 – 409 = 80

set 50 260 570 885 980 1240 1480
after min – min – min – min – min – min – min
80 – 72 – 56 – 40 – 34 – 33 – 31 – 30

Minutes lasted 1505

globe only yellow
fil Black clamps clean

Aug 13 1886

TAE

J. F. Ott

Tried several lamps having ~~fib~~ filaments Coated with Alumina, Magnesia — Calcium, Beryllium Zirconia — from their Chlorides & acetates — dipping fibre in Solution heating of Kerosene Chimney to decompose then passing quickly through flame — The Coating holds on filament up to about 20 to 25-cp then it seems to jump off although some filaments held long well — The contraction of the Oxide while the filament doesn't contract but very little causes this Cracking

Aug 13 1886 TAE

J. F. Ott

Martin has dipped a dozen Carbons in Coal tar in Benzol & Liquorice in Water then dipped them in finely powdered Oxide of Aluminum, Magnesia, and put them in mould & they are to be run through the Carbonizing process, the Theory being that the Tar will Carbonize & lock the oxide together — the Coating is very fair though not Complete = I am getting ready a lot of filaments about 1/2 Carbonized (ie brought up to 600 deg fahr & these I am going to dip

Aug 13 1886

J. F. Ott

in Tar Liquorice etc & then
in infusible Oxides & then
run through to final Carbonization
the shrinkage of the Carbon will
then be about Equal to the
tar Carbon — also I am going
to dip same Bamboo filaments
in tar & ~~[illegible]~~ infusible oxide
& Carbonize in regular way

I am also going to soak
fully Carbonized filaments
in tar — Licorice & other
Carbonizable ~~top~~ materials in
Liquid shape soaking
the filament before
Carbonization also when

Aug 13 1886 TAE

When partially Carbonized
(this is probably the best period)
& when fully Carbonized
so as to fill up the spaces
& breaks due to the initial
Carbonization of the Bamboo,

J. F. Ott

9/14/86 No 172 Box 2

v - amp - Res - Ftlb - lamps H.P. C.P. H.P. @ C.P.

113 - .73 - 155 - 3624 - 9.11 - 146 - 16

147 - 1.10 - 134 - 7167 - 4.60 - 368 - 80

set 60 90 180
rep - min min - min.

80 - 76 - 64 - 52

Minutes lasted 220

Rather dark for life - clamp
perfectly clean fil. dead block

172

Dried Aug 13 1886
~~J.F.Ott~~ J.E.

2 Milligrams Chl Carbon -
it all disappeared before heated
lamp - run it to red white
quickly & allowed it burn
for several minutes then
rather high - removed
globe clean clamp
Clean fil not as shiny
as it comes from Carbonization.

173 — Dried

Aug 13 1886 J.F.Ott

2 milligrams of Zerchl Carbon in glass tube at about 16 cp good shine afterwards went away so that the filament is not more shining than it comes from furnace — clamps & globe clear —

9/14/86 No 173 Box 3

V - amp - Res - Ft lbs - lamps H.P. - C.P. H.P. @ C.P.

100 - .73 - 139 - 3230 - 10.21 - 163 .. 16

132 - 1.04 - 127 - 6061 - 5.44 - 435 .. 80

at 50 90 180 470 580 1175 1285 1585

up - min - min - min - min - min - min - min - min

80 - 64 - 60 - 50 - 44 - 42 - 36 - 33 - 31

globe not very dark much less than obscured by + yellowish caste

Minutes lasted 1630

Clamps clear

Box 6.

9/14/86 No 174

| V | amp | Res | Ftlbs | lamps H.P. | C.P. H.P. | @C.P. |
|---|---|---|---|---|---|---|
| 104 | .78 | 133 | 3575 | 9.23 | 148 | 16 |
| 135 | 1.11 | 121 | 6686 | 4.97 | 398 | 80 |

Set up. —
80 ←

Arc'd in 2 minutes.

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174 — Dried

Aug 13 1886

J. F. Ott — Tag

Tube with 2 milligramm
Teschl Carbon —
brought it up quick.
fil no brighter — no blue
took it off before really
good vac as wanted to
get it off before Hg
had chance get in
no blue on clamps
Clamps not cleaned
fil no more shiny than
regular globe cham-

9/14/86 No. 175 Box 5

v - amp - Res - Ftlbs - lamp C.P.
H.P. - H.P. @ C.P.

97 - .74 - 131 - 3185 - 10.36 - 166 " 16
127 - 105 - 121 - 5884 - 5.61 - 449 " 80

set up - 60 min - 250 min.
80 - 76 - 50

Filamt lasted 290

globe yellowish black
Clamps pretty clean fil black
white at neck globe.

175 = Aug 14 1886 foq
Dried several hours
J. F. Ott

5 Milligrams Chl Carbon in tube put in got vac & then quickly run up to 90 @ 100 cp then put it back to. 25 cp & let it run — fil. deposited on — globe clean Except at neck yellow white deposits clamps not cleaned no halo or blue in globe took it off before good vac ——

Aug 14 1886

J. F. Ott

Put two regular Carbons in platina Clamps, then soaked or dipped in Coal tar several times, drying slightly after each dip — Then gave them to Joe to seal in also another Carbon in platina Clamps dipped several times in liquorice water — gave to Joe I propose to slowly heat lamp from low heat in drier to about 600 fahr put on pump & bring up slowly so as to Carbonize — The O of the Liquorice will probably Oxidize the whole of the Carbon if not sufficiently carbonized in drier — but the Tar will Carbonize in vacuum OK I think

176 — Dried with heat
J. F. Ott
fil in flat clamps soaked
several times liquorice
globe clean fil bright
clamps dirty —

9/14/86 No 176

| v | amp | Res | Ftlbs | lamps H.P. | C.P. H.P. | @ C.P. |
|---|---|---|---|---|---|---|
| 113 | .75 | 151 | 3760 | 8.78 | 141 | 16. |
| 147 | 1.10 | 134 | 7163 | 4.60 | 368 | 80. |

set.
up — :
80 —

Air'd immediately.

9/14/86 No. 177 Box 5

| v | amp | Res | Ftlb | lamps H.P. | C.P. H.P. | @ C.P. |
|---|---|---|---|---|---|---|
| 116 | .82 | 141 | 4203 | 7.85 | 126 | 16 |
| 150 | 1.18 | 138 | 7520 | 4.39 | 361 | 80 |

| pit up | 30 min | 60 min. |
|---|---|---|
| 80 | 96 | 80 |

Minutes lasted 80

globe yellow clamps dirty one very black
white around neck globe
fil browned

177 — Dried no heat - Iodine in Drier

J. F. Ott

Iodine in phos Cup —
got sealed tube & run quickly
to 100 cp not but air came
off no halo no blue — this
may be due to dirty pump
the Iodine dirties it badly
must put something in to
catch it before it get to tube
Think amalgamated Copper
answer & use no Iodine in
cup only in drier —
fil not shiny seems to be
acted on & clamps
untouched —

178 Dried on drier with heat,
Soaked in Tar - J. F. Ott
Clamps dont hold -

179 —

Dried without heat on drier
Iodine in drier — J. F. Ott

Iodine in phos Cap — color splendid
the pump didnt dirty so
bad but it got vac —
run it up quickly fil
Very Shiny — slight halo
after running ~~little~~ while
no blue in globe —
clamps dull —

9/14/86 No 179 Box 8
v — amp — Res — Ftlbs — lamp H.P. — C.P H.P. @ C.P
108 — .70 — 1.47 — 8185 — 10.86 — 166 .. 16
136 — 1.00 — 136 — 6017 — 5.48 — 438 .. 80

globe only ~~tinted~~
1/2 inch fil shiny
near clamp —
Dove clamp has
Lampblack on P clamp

set 80 125
up — min — min.
80 — 70 — 56

Minutes lasted 265

180. Dried on drier no heat
Iodine in drier - J. F. Ott

Iodine in phos Cup - pump dirty & stuck
fil rather shiny. didn't get good
vac - globe clean clamps
untouched no blue or halo —

9/14/86 No. 180 Box 2
v. - amp - Res - Ftlbs - lamp-C.P. H.P. - H.P. @ C.P
107 - .77 - 139 - 3628 - 9.09 - 145 .. 16
140 - 1.12 - 125 - 6946 - 4.75 - 380 .. 80

set 60
up - min.:
80 - 80

Arc'd Minutes lasted .9.0.

globe yellow white
fil still shiny

9/14/86. №. 181 Box 7

V - amp - Res - Ftlbs. - lamps C.P. H.P. - H.P. @ C.P.

106 - .79 - 134 - 3716 - 8.87 - 142 .. 16

137 - 1.10 - 124 - 6780 - 4.91 - 393 .. 80

set up - 80 min - 90 min

80 - 84 - 80

[illegible] lasted 180

Yellowish globe fil dead black
Clamps dirty white deposit near
clamps then deep yellow

181 — J. F. Ott

Dried for 1½ hour in drier without heat — Iodine in drier put on pump with U shaped tube with Copper Shot cleaned by SO4 — new phos anhydride & 10 @ 15 - milligram Iodine on top of phos Anhy — got quick Vac — no halo no blue, brot it up very high clamps got clean when heat on fil but quickly filaments darken by residual Iodine fil very shiny — ~~vac~~ took it off ~~moment~~ tube thawed clear — hence not very good vac — globe clear —

J. F. Ott

182 — Dried on clean drier with only phos anhy & an only 5 minutes — Copper plated Clamps coated slightly with silver Cyanide Solution: put on pump & quickly Exhausted very little air came off very quickly on almost melting clamp very little of any air came off — the silver nearly all volatilized on neck of globe leaving clamps Copper Colored fil not very shiny

9/15/86 No. 182 Box

| v | amp | Res | Ft lb | lamp H.P. | C.P. / H.P. | @ C.P. |
|---|---|---|---|---|---|---|
| 110 | .75 | 140 | 3672 | 8.99 | 144 | 16 |
| 143 | 1.10 | 130 | 6959 | 4.74 | 379 | 80 |

set up - 80 min - 115 min - 240 min

80 - 80 - 60 - 54

globe rather dark
Clamps shiny
fil black

Minute lasted 835

183 — Dried 10 mins — J. F. Ott

Long tube with about 8 milgms
Chl Carbon — got vac then brought
it up rather quickly & got
Vac before much Chl Carbon
Volatilized) then brot to white heat
& heated ChCl with Kerosene
good deposit — a very white
Volatile substance apparently
2 of them in Vac. Clamps
dirty had Copper shot in
U tube but didnt seem absorb
Chlorine — good vac —
flashing — although not
Extraordinarily so —

Dried — J. F. Ott

Platina Center piece —
fil mod shiny — clamps lead
Color globe clear —
great deal gas come off
before heating — Connecting
platina to Negative side —
down stairs —

185 =

185 Sept 16 1886

Dried — J.F. Ott

Aluminum sheet with Center wire - fil slightly frowned one side clamps not cleaned - globe Cleaned - Connected to Negative side down stairs -

9/16/86 No 186 Box 7

| V | amp | Res | Ftlbs | lamps H.P. | C.P. H.P. | @ C.P. |
|---|---|---|---|---|---|---|
| 107 | .67 | 160 | 3185 | 10.36 | 166 | " 1.6 |
| 143 | 1.04 | 137 | 6547 | 5.04 | 403 | " 80 |

Wire to Negative.

Blue in globe which soon disappeared, Blue on clamp, which increased in size and density, until a deep blue sphere formed, about ½" in diameter. — soon settled to close deep blue along clamp.

Minute lasted 10 — arcd

arcd

186 —

J. F. Ott

fil of bamboo soaked

Tar — clamps clean

fil not shiny · globe clea

9/16/86 No 186 Box 7

| V | amp | Res | Ftlbs | lamps H.P. | C.P. H.P @ C.P. |
|---|---|---|---|---|---|
| 101 | .92 | 109 | 4114 | 8.02 | 128 " 16 |
| 132 | 1.35 | 97 | 7884 | 4.19 | 335 " 80 |

set - 30
up — min

80 - 80

Minutes Carbid 50.

Anew in!

187 -

Dried quickly — J. F. Ott

Copper clamps nickel plated
by Hamilton not well washed
great deal air when clamp
got hot - some nickel
volatilized - probably Cu
melted green color in neck
Lamp - clamps not very
shiny fil little browned
one side globe clear -

9/17/86 No 187 Box 3

V - amp - Res - Ftlbs - lamp H.P. C.P. H.P. @ C.P.
108 - .76 - 142 - .3632 - 9.09 - 146 " 16
144 - 1.14 - 127 - 5804 - 5.69 - 455 " 80

globe black -
fil black

set 40
up - air
80 - 78 -

Carbon loose in clamp.

Minutes lasted 225

188 — not dried J. F. Ott

small glass tube of Potassium heated after vac obtained, fil shiny Clamps clean globe quite yellow on one side — metal on neck glass —

9/17/86 No. 188 Box 5

V — amp — Res — Ft lbs — lamp H.P. — C.P. H.P. @ C.P.

112 — .75 — 149 — 3712 — 8.90 — 142 . 16

147 — 1.07 — 137 — 0959 — 4.74 — 379 . 80

set 40
up — min
80 — 84

Minutes lasted 45.

Accidentally cracked + oxidized

fil block —

189 — Not dried J. F. Ott

Small piece of Platinum got vac — heated only gently not enough to volatize it — Clamp Clean — globe clean fil shiny

9/17/80 No 189 Box 7

| v | amp | Res | Ft lbs | Lamps H.P. | C.P. H.P. | @ C.P. |
|---|---|---|---|---|---|---|
| 110 | .75 | 149 | 3650 | 9.04 | 145 | 16 |
| 149 | 1.11 | 135 | 7317 | 4.51 | 361 | 80 |

act
up —
80 — Blue on clamp — Resistance ran up.

Arc'd in 5 minutes.

9/17/86 No 190 Box 7

v - amp - Res - Ftlbs - lamp H.P. - C.P. H.P. @ C.P.
102 - 1.10 - 93 - 4964 - 6.65 - 106 " 16
128 - 1.46 - 88 - 8268 - 3.87 - 300 " 80

set. 30
up - min
80 - 80

Minute lasted 40.

globe whitish & clean
fil beautiful shine
broke in center gp at shiny
clean up to break -
End of fil clamp piece black
Clamps unchanged

---

190 — Undried — J. F. Ott

Small tube Potassium not
blotted - had probably some
Benzine in - got 1/2 vac.
Say 22 inches Mercury
Sealed off then heated
potassium - with Kerosene
white cloud of Monoxide
probably then formed -
heated it strongly then
brought up lamp. suddenly
it went up in Cp greatly
& on [illegible] current found
it was deposited on
fil most shiny have seen
Clamps black globe
slightly opalescent —

Undried — J. F. Ott

25 Milligrams Napthaline
in side tube - notice it
deposits at yellow white
by natural Evaporation
Napthaline without heat
Elegant deposit It comes
off slow — if too quick
makes yellow deposit —
globe somewhat opalescent —
clamp not clean —
fil very shiny —

Undried

192 - Regular Lamp — J. F. Ott

Tried Experiment of putting condenser 8 Mfarads with & without resistance & magnet across lamps & in series around magnet to effect the carrying of blue halo no Effect perceptible

got good vac reversed Current, then broke vac & reexhausted 2nd time very small amount gas came off reversed Current got both clamps red hot, then broke vacuum slightly say to 27 inches & reexhausted, no air at all came off this time allowed it run 1/2 hour to get high vac without heating sealed off heated globe at times for 1/2 minute with Kero lamp — fil not so shiny as [illegible] comes from Carbonizing house. clamps shiny globe clean —

193 — Dried — J. F. Ott

Washed with Nitric acid dilute
rinsed then water put in with few
drops Silver plating Solution ;
silvered clamps Then well rinsed
put on drier — got vac reversed
Current worked high & melted
clamps heated bulb with
Kerosene Lamp — the broke Vac to
say 27 inches reexhausted
ran Lamp up & got no air
Then let it run for 1/2 hour —
Silver all went off clamps to
globe — fil. Shiny

194 — undried J. F. Ott

got vac — recurred & got both clamps red hot got high vac then broke vac to 27 inches; reexhausted & left it run 1/2 hour after got solid tube heated & softened stem 60 minutes before Sealing — clamps.

clean globe clean

fil Okay —

195 —

Same as 194 —
but not fully shiny —

196—

J.F.Ott

Same as 193— Except
Vac brake & little tube of
Chl Carbon put in— fil then
brot to 16 cp and allowed
to burn until Chl all gone
& blue came on running
high — little whitening &
iridescence in neck clamps
clean — fil not deposited
on or at least not more
sheeny than from furnace

197
Same as 193 J. F. Ott

Except on breaking Vac
some phos anhy wet or
viscous got in bulb —
put ~~same~~ tube Chl Carbon
in & worked as with 196 —
great amount whitening in
neck clamps fairly clear
other part globe clear - fil
not deposited on in fact
one side slightly browned —

198 — not dried

J. F. Ott

Got Vac broke it little phos acid got in globe — re exhausted Lamp worked poorly all way through reversed Current — Clamps clean fil not very shiny —

199 – not dried. J

Put on 3 minute pump with side U tube containing phos anhy. in glass + a cup for heating things, – in cup put Chl. Chromium ter – got vac removed + got clamps red hot, then let in Chlorine – got vac heated then let Chlorine in again – got vac + sealed off – clamps clean fil shiny globe clear – Vac good –

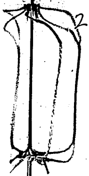
Sept 22 1886 -

200. undried

J. F. Ott

Put on regular pump with
stopcock U tube containing
Phos anhy & bulb containing
Pentachloride phosphorus
got vac on all then shut
off Pentachloride —
the tube badly blackened
got vac reversed current
heated both clamps
red hot & got them clean
then turned cock & let
in pentachloride, this
broke vac to say 28½ inches it
got vac again quickly as it was
probably absorbed by pentachl
The penta attacks & blackens
Copper - got good vac sealed
off - fil very shiny - clamps
black globe clear of all
deposit — This Lamp had penta in globe
when first worked 201 had none —

J. F. Ott



Same as 200
Except no pencil in
globe when first started
Except perhaps little
that was in pump —
clamps one dirty other
Somewhat clean fil
shiny globe no deposit
of any Kind —

200

lamp C.P.
v – amp – Res – Ftlbs – H.P. – H.P. @ C.P.
104 – .72 – 145 – 8320 – 9.94 – 159 " 16
136 – 1.06 – 129 – 6400 – 5.15 – 412 " 80

201

102 – .72 – 142 – 3250 – 10.13 – 162 " 16
131 – 1.03 – 128 – 5975 – 5.52 – 442 " 80

202.

107 – .75 – 143 – 3585 – 9.25 – 148 " 16
137 – 1.08 – 127 – 6550 – 5.04 – 403 " 80

203

135 – .82 – 165 – 4900 – 6.73 – 108 " 16
Ans'd on Photometer.

204

103 – .75 – 138 – 3425 – 9.64 – 154 " 16
133 – 1.10 – 121 – 6475 – 5.10 – 408 " 80

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202 Undried J.F.Ott

10 milligrams

Strongly ignited Caustic Potash – clamps clean blue hangs persistently Cant get off – Vac not very high – the fil ~~has spot in it~~ – shiny – globe clean –
Had a spot in it,

203 —

Same as 202 —
[illegible] had no Opat in it) —

Sept 22 1886

204

Undivided —

Same as 201 - one clamp
dark —

205 — J. F. Ott

Undried —

Strong fused Caustic Potash
25 milligram; run on
pump for 1/2 hour with
Kerosene then for 1/2
hour after good vac
then brot it up quickly
to 100 Cp — very little
blue & strange to say
scarcely any air came
out & no carrying to
clean clamps even at
100 cp — clamps unchanged
took it off quickly after run
up fil shiny — KO. St. x to
glass — funny Lamp

206 J. F. Ott

Same as 205 —

Except some blue &
also halo which partly
cleaned one clamp
didnt reverse Either
on 205 or this, feel sure
~~not~~ one clamp dirty &
other not very clean.
worked it like 206 —

Kerosene was in this
longer —

207—

Sept 24 1886—

undried —

J. F. Ott

Put in on pump with U tube
containing tube of Chl Silicon
Cut off the Chl Si got Vac
& then let in Chl Silicon —
run it up quickly showed
halo [illegible] carbon
very shiny probably deposit
Silicon — clamps
clean — globe slightly
tinted in neck —

208 — undried

J. F. Ott

tried KO in globe
almost impossible in
fact impossible work
blue halo off, clamp
great tendency melt,
fil browned one side
clamp x clean
globe clean

209.

Same as 208

J F Ott

U tube with Cyanide
Silver — got vac. heated
Cy & let it in
then lighted. Carbon
when about 25 inch
Hg — deposit of Carbon
globe darkened & also
whitened — clamps
Block —

Undried — J. F. Ott

20 mg Iodide Pal vacuum in
globe, works well —
clamps clean —
globe clean fil very
shiny —

212

Same as 211

213

Same as 211 —

214 — [illegible]

J. F. Ott

Reg lamp left on
pump about 2 hours
before putting current
on then on about hour
could bring it up to
about 80 before Halo
appeared - cleaned
clamps - very little air
came off when clamp
got ~~hot~~ - sealed off
not very good vac
fil shiny globe clear
clamps clean

Sept 26 1886

Memorandum — J. F. Ott.

Tried not very good

Put flat platinum inside of filament & soak in syrupy chloride platinum; or Double Chl of Pt and Ammonia heat & see if Locks together (ie) metallic pt deposited — also immerse the joints in syrupy solution of Chl plat & pass current to bring joint to red heat or use arc decompose the PtCl — also try Hg Amalgam & Cu also Pt amalgam. —

Put bamboo filament in sealed tube along with phos anhy & chloride Carbon in cool End also some Copper dust to absorb the Cl — then heat to red heat protect Eyes — do it slowly try different thing in tube Try filament with $PO_5$ — alone in cool part also with nothing also ascertain what temperature great change take place in carbon — use sand bath & Thermometer Try Sodium to absorb $H_2O$ instead $PO_5$ — —

Put $PO_5$ — Chl Carbon Copper dust & fil bamboo & get vac Then Carbonize by heat — also fil with CCl only

Memo — Sept 26 1886 J. F. Ott

Paint a plated joint with syrupy PtCl then get vac — (heat the Cu joint in flame before putting on PtCl) then bring fil up so clamp heated & PtCl decomposed — also make a plat socket break shank of carbon & insert tight fit then work syrupy Chl Plat in & decompose by needle point flame or arc.

See if by long running a lamp can be worked up to 100 cp without cleaning clamps.

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Use spark gauge with carbon Electrodes & at low pressure (ie) point where greatest volume spark - spark must not touch sides glass, — see if carbon deposited also try in gasolene gas to deposit with spark. Try two carbon Electrodes side by side in gasolene & use jump spark — Try Licorice & sugar on plat to shank & put whole in Magnesia so pt wont melt, — make 12 plat cups by flattening & spiraling end pt wire break shanks off carbon insert & plate with Cu get life —

Memo Sept 26 1886 - J. F. Ott

Nitrocellulose the surface of reg fibres
immerse in Ether alcohol Solution dry
+ then reduce by Sulphydrate ammonia.
also cut fils out of nitrocellulose
paper — immerse in Ether, alcol Sol
dry & reduce to cellulose by Sulphydrate
ammonia — try Stannite Sodium

see if can get solvent for charcoal
looking residue from the Oil Cos
retorts. see if soften — make
some Caramel Carbonize a fil in
hot sugar treat sugar with
slaked lime then boil down hard
& see if it Carbonizes without melting

Soak some paper (smooth) in Sugar for
2 days also caramel also starch
dry & cut some filaments get life —
Draw fibres through die hot see
amount lengthening & shrinking

215. undried — J.F. Ott

Gasolene in U annex tube - got vac' — let in gas got Vac let in gas & put lamp at 1/2 candle power as vac increased went up to 2 cp — after good Vac run up very high' clamp sort of melted didnt re vac' — halo strong Couldnt get rid of it globe slightly whitened fil okay but gives very little deposit clamp that was heated black altho unchanged — slight green on narrow neck due to Cu — Volatilized without being oxidized.

216 — undried — J. F. Ott

Put on 8 foot tube with U in Ice water to get rid Hg — Spectroscope Observed very little Hg — fil slightly browned clamps & globe Clean

217 — undried — J.F.Ott

Put on U annex with gasolene
got vac several times & let
gasolene in after each burning
Lamp at 1/2 cp — finally
got vac good run her up —
let it burn 20 mins —
noticed Carbon browned
broke vac slightly & run up
high depositing on Carbon
which is very shiny — got good
vac sealed off — globe
very slightly white with
tint brown — clamps clean.

218

J. F. Ott

Same as 216 — but there was strong Hg in spectroscope — didn't reverse one side fil. browned, — clamps clean globe ditto.

219 windmill -

J. F. Ott

Put in on vac pump let it
run for 1/2 hour after getting
solid tube Brot it up very
slowly. Taking care not
to clean clamps removed
Current at last let
it burn for hour after
wkg air all out at 80
Cp - fil browned one side -
Tube darkened slightly
in spots matted carrying
This is seen in lamps ~~at~~
Sometimes, it is due probably
to high Vac - clamps
finally got cleaned
when it was at 80

220 — unground — J. F. Ott

20 feet tubeing in Ice water
6 feet from pump — fil burned
long while at 30 cp when
spectroscope shewed faint Hg
Could put whole 150 volts
on without melting clamp
clamps clean fil little
off color globe clean -

221— unwashed

Reg lamp got vac worked
clamp clean let in $HCl$
then reexhausted heated
got vac then let $HCl$ in
again got clean tube
heated then sealed off

222 —

Lamp heated Kero good vac didnt put Current on - sealed of ~~[illegible]~~